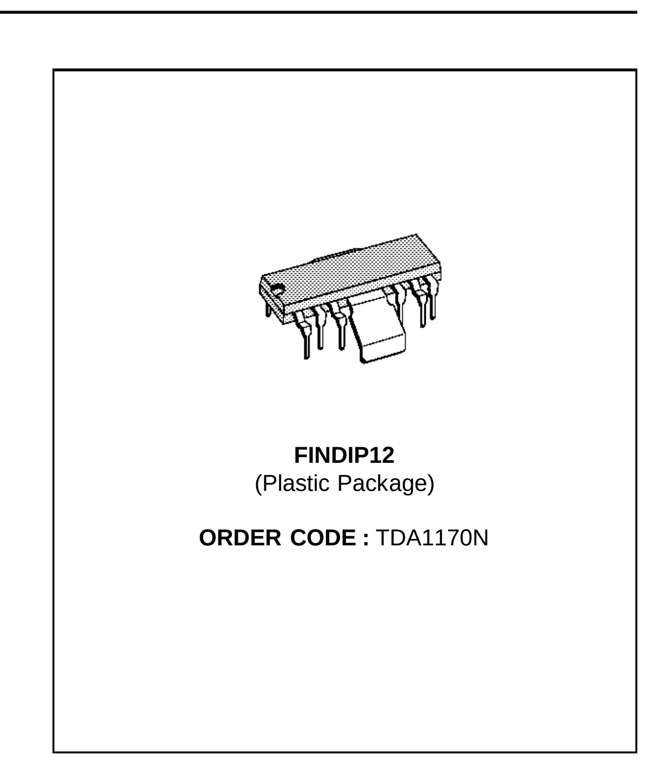


TDA1170N

LOW-NOISE TV VERTICAL DEFLECTION SYSTEM

- COMPLETE VERTICAL DEFLECTION SYSTEM
- LOW NOISE
- SUITABLE FOR HIGH DEFINITION MONITORS



FINDIP12
(Plastic Package)

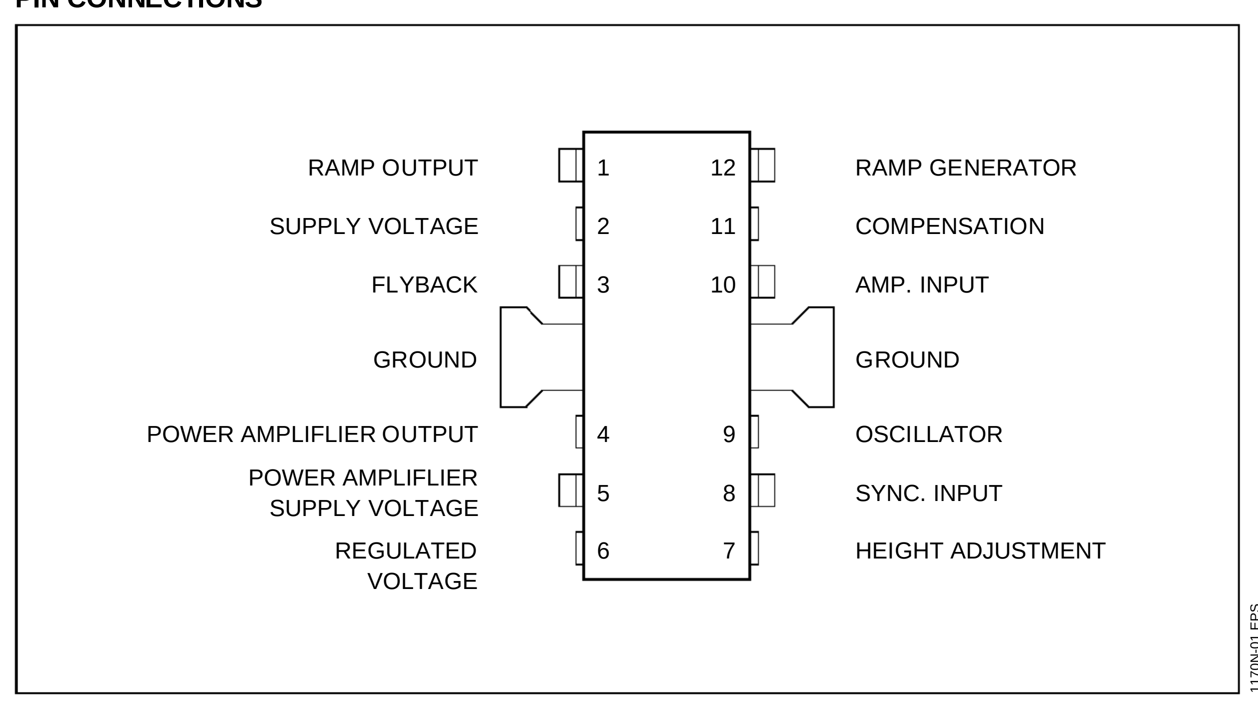
ORDER CODE : TDA1170N



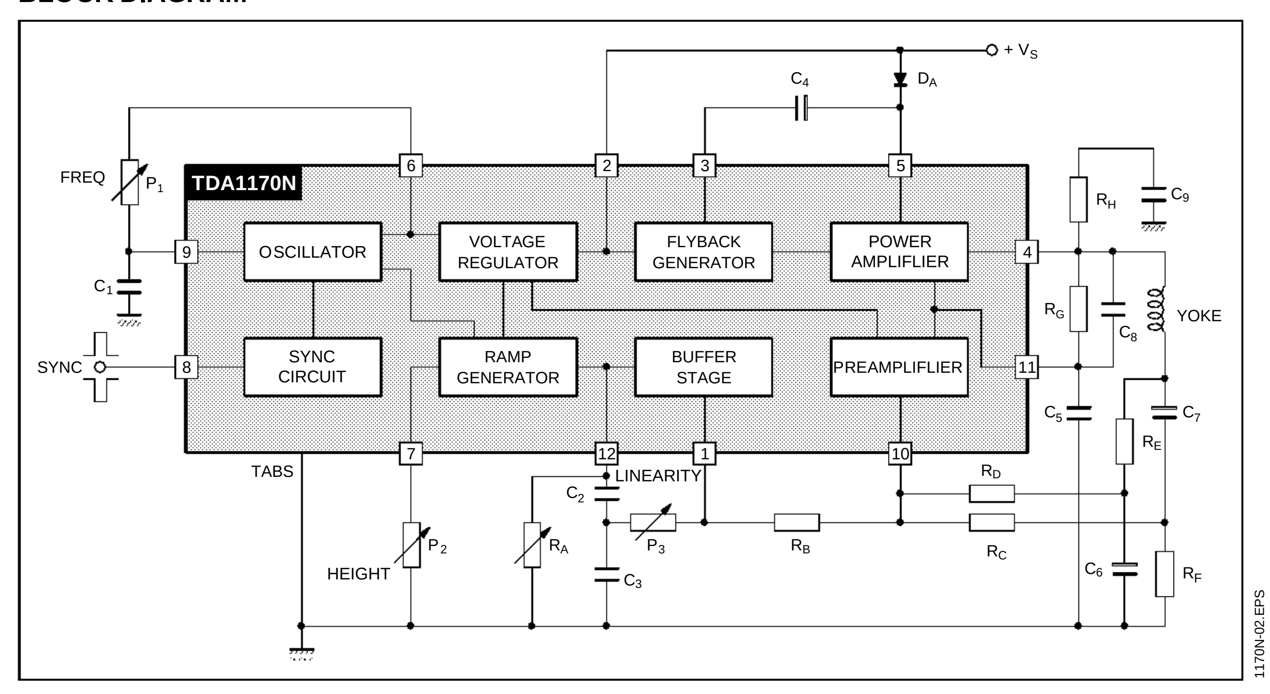
DESCRIPTION

The TDA1170N is a monolithic integrated circuit in a 12-lead quad in-line plastic package. It is intended for use in black and white and colour TV receivers. Low-noise makes this device particularly suitable for use in monitors. The functions incorporated are : synchronization circuit, oscillator and ramp generator, high power gain amplifier, flyback generator, voltage regulator.

PIN CONNECTIONS



BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_S	Supply Voltage at Pin 2	35	V
V_4, V_5	Flyback Peak Voltage	60	V
V_{10}	Power Amplifier Input Voltage	+ 10 – 0.5	V V
I_o	Output Peak Current (non repetitive) at t = 2msec	2	A
I_o	Output Peak Current at f = 50Hz t ≤ 10µsec	2.5	A
I_o	Output Peak Current at f = 50Hz t > 10µsec	1.5	A
I_3	Pin 3 DC Current at $V_4 < V_2$	100	mA
I_3	Pin 3 Peak to Peak Flyback Current for f = 50Hz, t_{fly} ≤ 1.5msec	1.8	A
I_8	Pin 8 Current	± 20	mA
P_{tot}	Power Dissipation : at T_{ab} = 90°C at T_{amb} = 80°C (free air)	5 1	W W
T_{stg}, T_j	Storage and Junction Temperature	– 40, +150	°C

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THERMAL DATA

Symbol	Parameter		Value	Unit
$R_{th\ j\text{-}tab}$	Thermal Resistance Junction-tab	Max	12	°C/W
$R_{th\ j\text{-}amb}$	Thermal Resistance Junction-ambient	Max	70	°C/W *

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* Obtained with tabs soldered to printed circuit with minimized copper area.

ELECTRICAL CHARACTERISTICS

(Refer to the test circuits, V_S = 35 V, T_{amb} = 25^{0}C,unless otherwise specified)
DC CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit	Fig.
I_2	Pin 2 Quiescent Current	$I_3 = 0$		7	14	mA	1b
I_5	Pin 5 Quiescent Current	$I_4 = 0$		8	17	mA	1b
$-I_9$	Oscillator Bias Current	V_9 = 1V		0.1	1	µA	1a
$-I_{10}$	Amplifier Input Bias Current	V_{10} = 1V		1	10	µA	1b
$-I_{12}$	Ramp Generator Bias Current	$V_{12} = 0$		0.02	0.3	µA	1a
$-I_{12}$	Ramp Generator Current	I_7 = 20µA, $V_{12} = 0$	18.5	20	21.5	µA	1b
$\frac{\Delta I_{12}}{I_{12}}$	Ramp Generator Non-linearity	ΔV12 = 0 to 12V, I_7 = 20µA		0.2	1	%	1b
V_s	Supply Voltage Range		10		35	V	
V_1	Pin 1 Saturation Voltage to Ground	I_1 = 1mA		1	1.4	V	
V_3	Pin 3 Saturation Voltage to Ground	I_3 = 10mA		300	450	mV	1a
V_4	Qiuescent output Voltage	V_S = 10V R1 = 1kΩ, R2 = 1kΩ	4.1	4.4	4.75	V	1a
		V_S = 35V R1 = 3kΩ, R2 = 1kΩ	8.3	8.8	9.45	V	1a
V_{4L}	Output Saturation Voltage to Ground	$-I_4$ = 0.1A $-I_4$ = 0.8A		0.9 1.9	1.2 2.3	V V	1c 1c
V_{4H}	Output Saturation Voltage to Supply	I_4 = 0.1A I_4 = 0.8A		1.4 2.8	2.1 3.2	V V	1d 1d
V_6	Regulated Voltage at Pin 6		6.1	6.5	6.9	V	1b
V_7	Regulated Voltage at Pin 7	I_7 = 20µA	6.2	6.6	7	V	1b
$\frac{\|\Delta V_6\|}{\Delta V_S}$; $\frac{\Delta V_7}{\Delta V_S}$	Regulated Voltage Drift with Supply Voltage	ΔV_S = 10 to 35V		1		mV/V	1b
V_{10}	Amplifier Input Reference Voltage		2.07	2.2	2.3	V	
R8	Pin 8 Input Resistance	$V_8 \leq 0.4V$	1			MΩ	1a

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Figure 1 : DC Test Circuits

Figure 1a

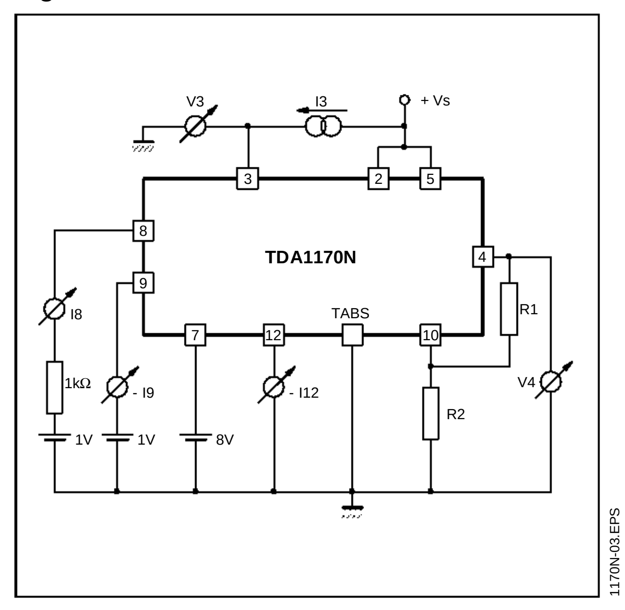


Figure 1b

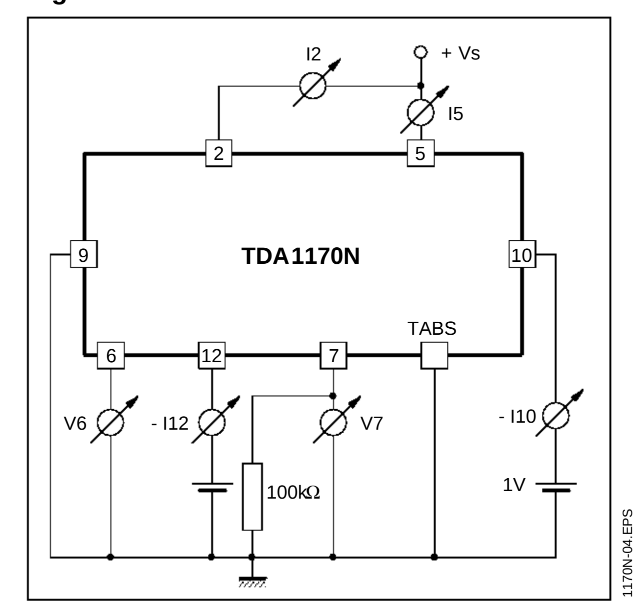


Figure 1c

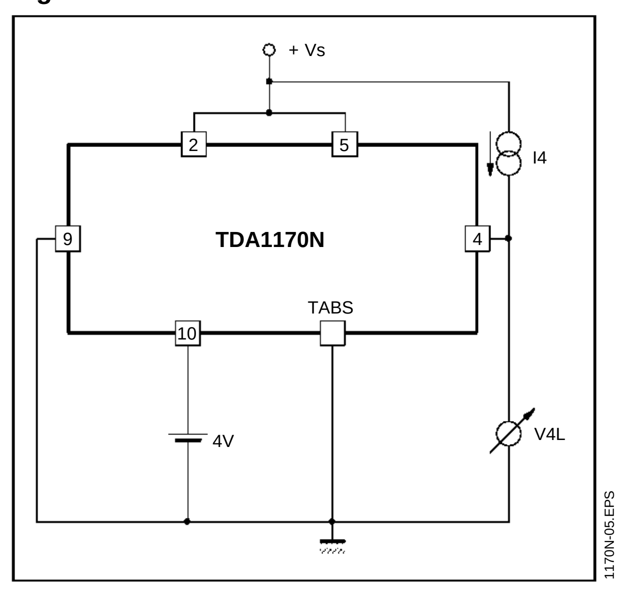
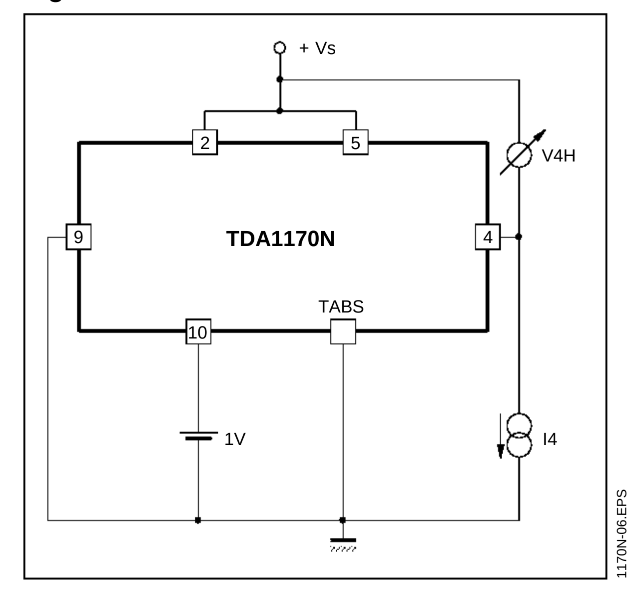


Figure 1d



ELECTRICAL CHARACTERISTICS

(Refer to the AC test circuit, V_S = 22V ; f = 50Hz ; T_{amb} = 25°C, unless otherwise specified)
AC CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_s	Supply Current	I_y = 1App		140		mA
I_8	Sync. Input Current (positive or negative)		500			µA
V4	Flyback Voltage	I_y = 1App		45		V
t_{fly}	Flyback Time	I_y = 1App		0.7		ms
V_{ON}	Peak to Peak Output Noise	Pin 9 Connected to GND			40	mV_{PP}
f_o	Free Running Frequency	(P1 + R1) = 300kΩ, C2 = 0.1µF (P1 + R1) = 260kΩ, C2 = 0.1µF		42.2 48.5		Hz Hz
Δf	Sychronization Range	I_8 = 0.5mA	14			Hz
$\frac{\Delta f}{\Delta V_S}$	Frequency Drift with Supply Voltage	V_s = 10 to 35V		0.005		Hz/V
$\frac{\lvert \Delta f \rvert}{\Delta T_{ab}}$	Frequency Drift with tab Temperature	T_{tab} = 40 to 120°C		0.01		Hz/°C

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Figure 2 : AC Test and Application Circuit for Large Screen B/W TV Set 10Ω/20mH/1App

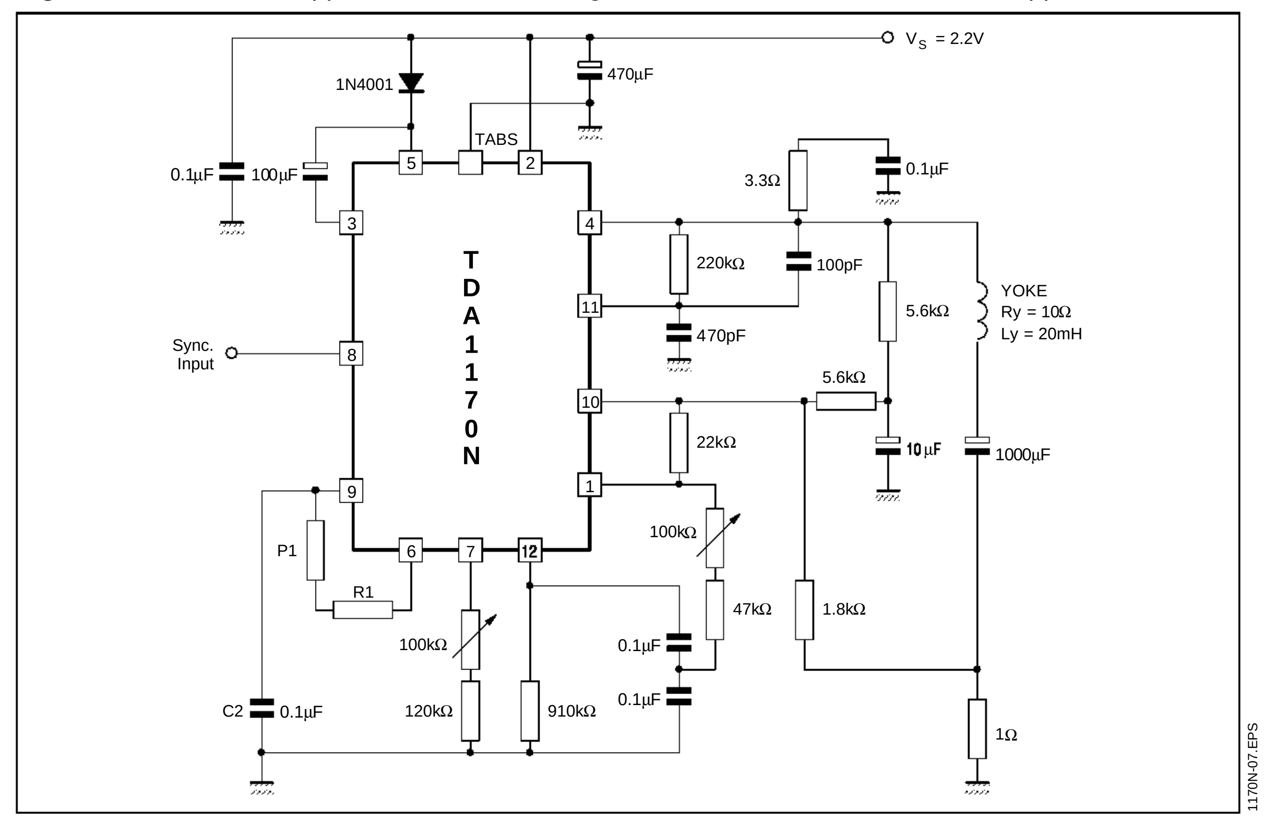


Figure 3 : Typical Application Circuit for Small Screen 90° TVC Set (R_Y = 15Ω, L_Y = 30mH, I_Y = 0.82 App)

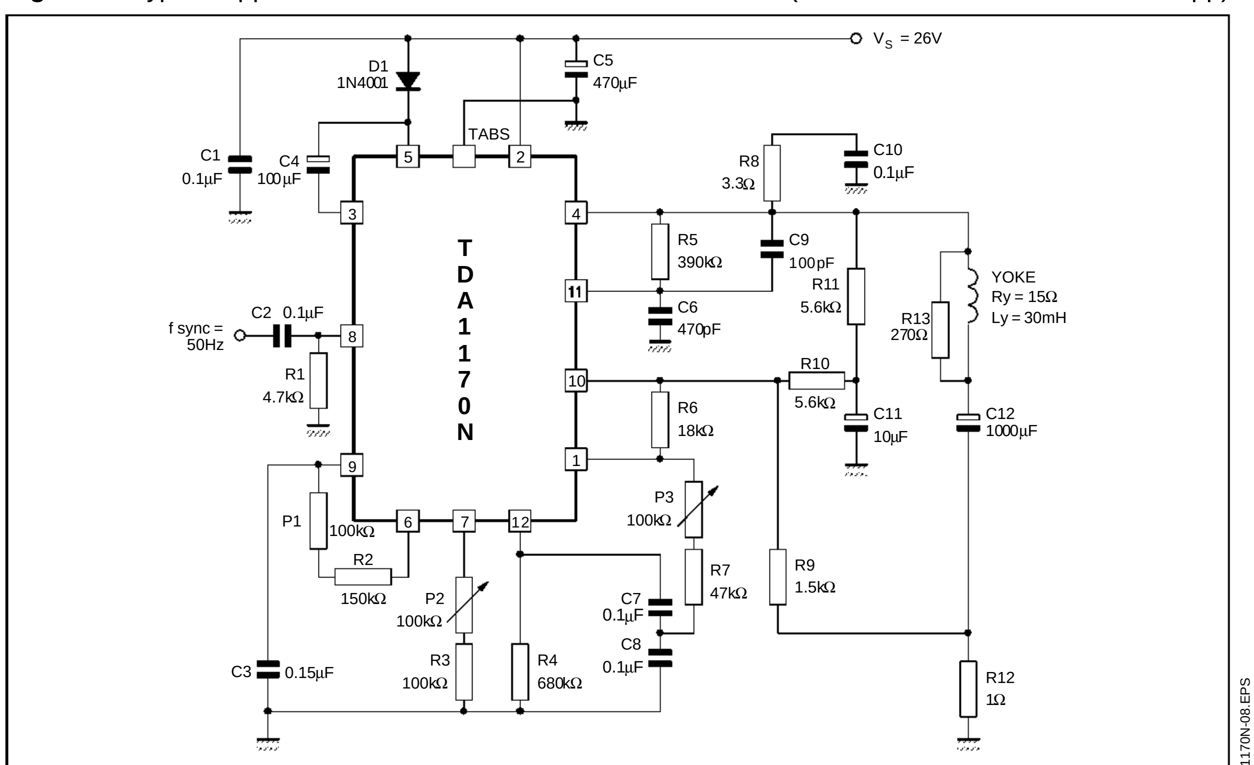
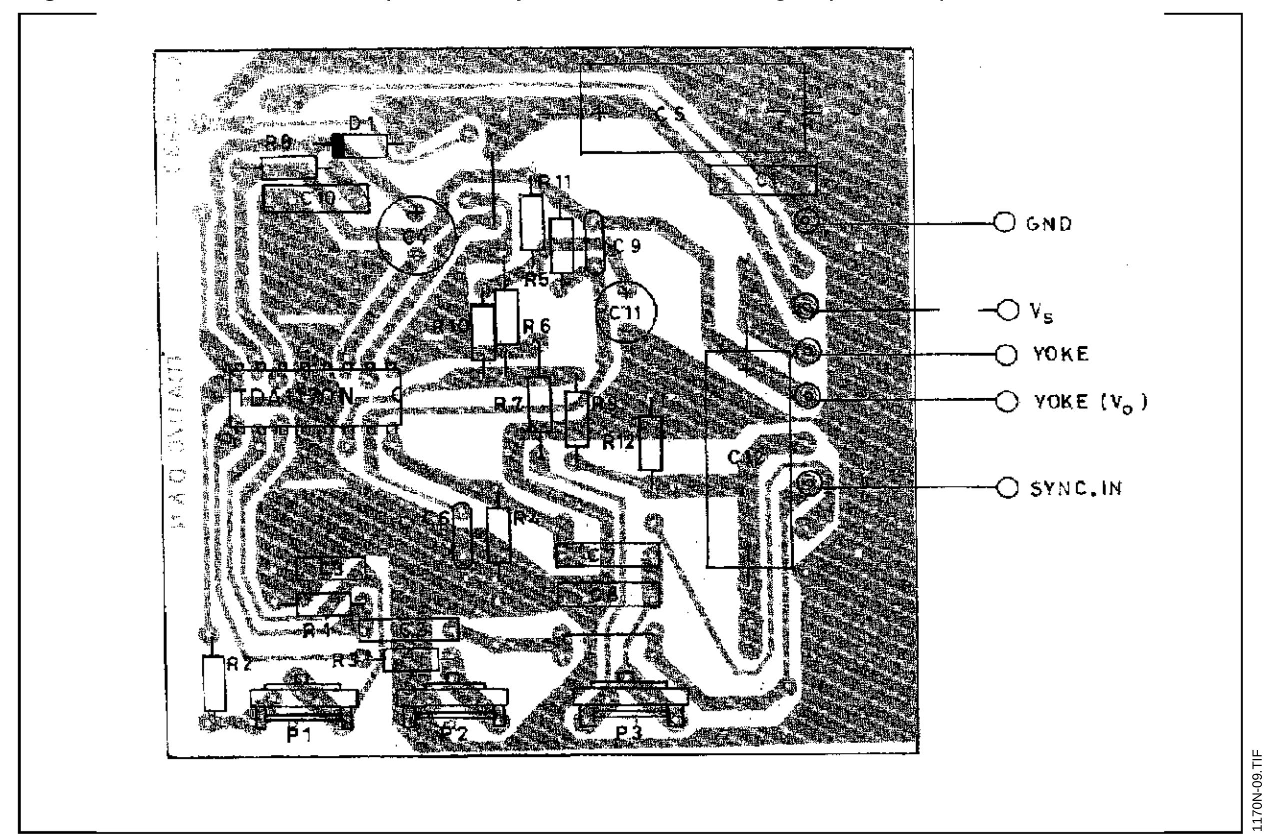


Figure 4 : P.C. Board and Components Layout of the Circuit of fig. 3 (1:1 scale)



MOUNTING INSTRUCTION

During soldering the tab temperature must not exceed 260°C and the soldering time must not be longer than 12 seconds.

The external heatsink or printed circuit copper area must be connected to electrical ground.

The junction to ambient thermal resistance can be reduced by soldering the tabs to a suitable copper area of the printed circuit board (fig. 5) or to an external heatsink (fig. 6).

The diagram of fig. 7 shows the maximum dissipable power P_{tot} and the $R_{th\ j\text{-}amb}$ as a function of the side "e" of two equal square copper areas having a thicknessof 35 µ (1.4 mil).

Figure 5 : Example of P.C. Board Copper Area Used as Heatsink

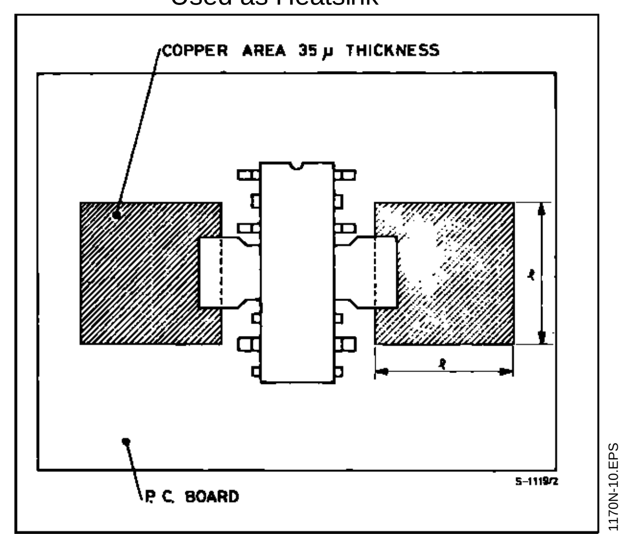


Figure 6 : Example of External heatsink

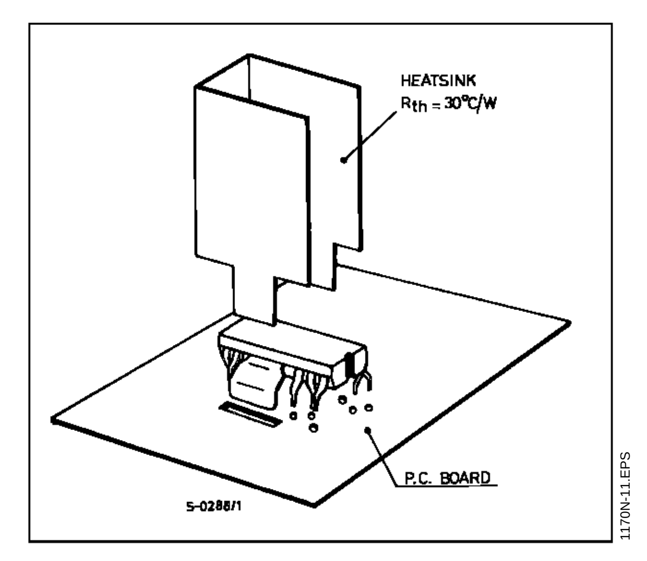


Figure 7 : Maximum Power Dissipation and Junction-Ambient Thermal Resistance versus "e"

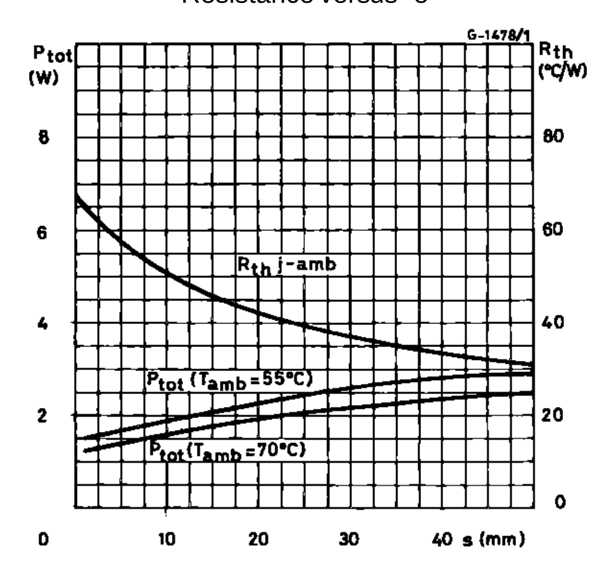
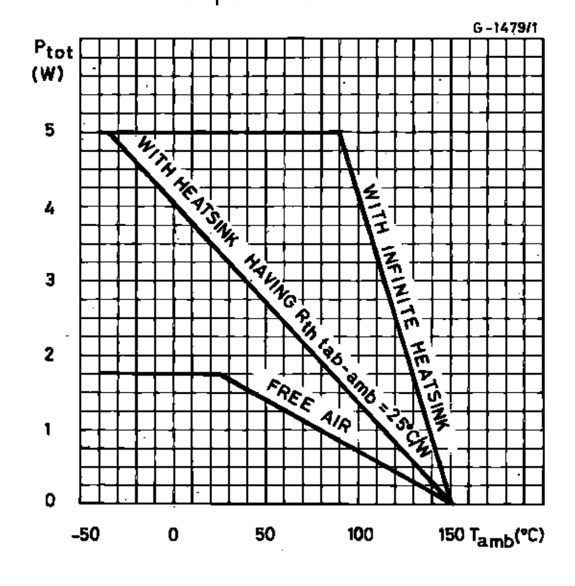
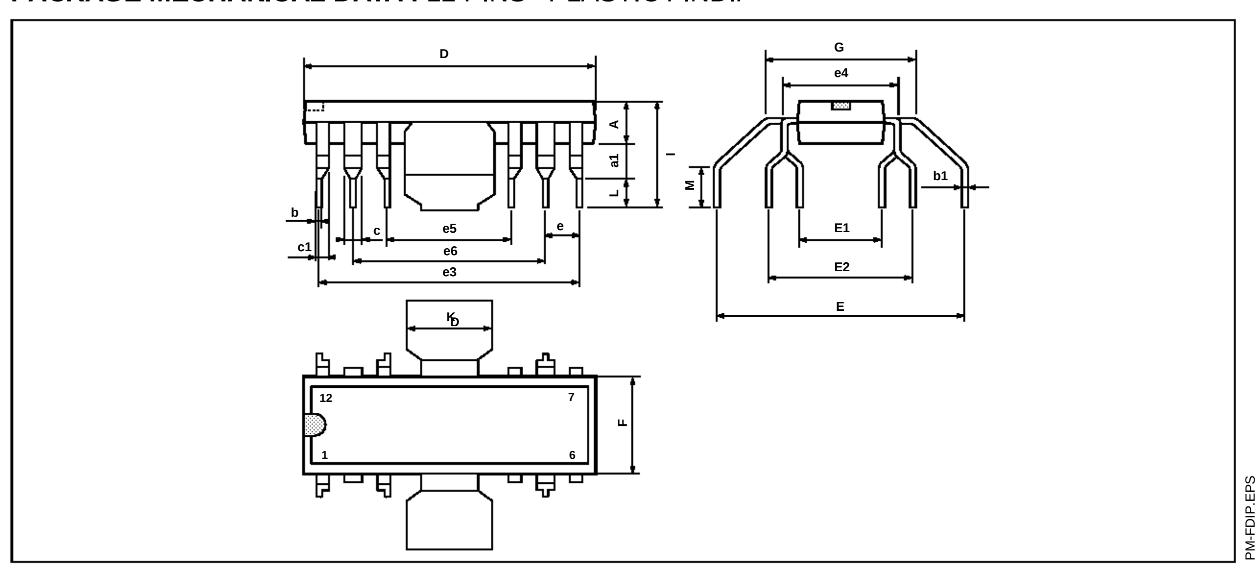


Figure 8 : Maximum Allowable Power Dissipation versus Ambient Temperature



PACKAGE MECHANICAL DATA : 12 PINS - PLASTIC FINDIP



Dimensions	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	3.8		4.05	0.150		0.159
a1	1.5		1.75	0.059		0.069
b	0.55		0.6	0.022		0.024
b1	0.3		0.35	0.012		0.014
c		1.32			0.052	
c1		0.94			0.037	
D	19.2		19.9	0.756		0.783
E	16.8	17.2	17.6	0.661	0.677	0.693
E1	4.86		5.56	0.191		0.219
E2	10.11		10.81	0.398		0.426
e	2.29	2.54	2.79	0.090	0.100	0.110
e3	17.43	17.78	18.13	0.686	0.700	0.714
e4		7.62			0.300	
e5	7.27	7.62	7.97	0.286	0.300	0.314
e6	12.35	12.7	13.05	0.486	0.500	0.514
F	6.3		7.1	0.248		0.280
G		9.8			0.386	
I	7.8		8.6	0.307		0.339
K	6.1		6.5	0.240		0.256
L	2.5		2.9	0.098		0.114
M	2.5		3.1	0.098		

FINDIP.TBL

